NOVEMBER 2024

Building Soil Health and Resilient Conservation Champions through Collaboration and Data-Sharing

An Alabama and Mississippi based demonstration project led by Sand County Foundation

Project Background

Soil moisture and temperature are key drivers of agricultural production systems, dictating planting schedules, crop development, and timing of field work. Over the past few decades, Mississippi and Alabama soils have become drier and droughts are more prevalent, yet the precipitation falling during heavy rainstorms has also increased. This on-farm demonstration will integrate CropX soil sensors with the collection of soil health samples to enable farmers to make in-season management decisions based on real-time soil moisture and temperature data. Results will address growing farm management concerns in areas challenged by extreme (abundance or deficit) precipitation events.

By comparing data collected on fields where soil health management principles have been implemented with data from adjacent conventionally managed fields, farmers will have the opportunity to better understand how management can influence water infiltration and holding capacity, soil trafficability, leaching potential, aggregate stability, and other soil properties critical to improving climate resiliency.

Evaluation Approach

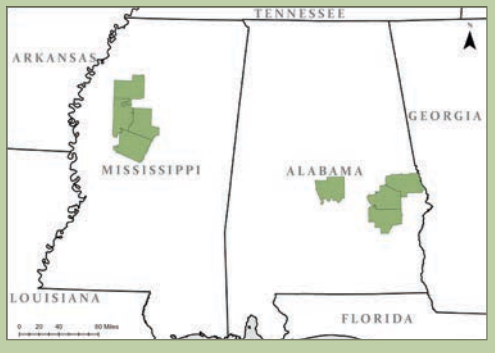
Thirteen paired (26 total) fields on similar soil textures and landscapes were selected.

Soil Health Management

Field should have been managed with soil health principles for three or more years.

Conventional Management

The paired field will be conventionally managed, located adjacent to the soil health managed field.



To verify consistency in soil characteristics between the field pairs, EarthOptics applied their soil mapping technology to confirm electrical conductivity and soil map units for each field. After consulting with each farmer, locations in the paired fields were chosen for the installation of the CropX soil sensors, which collect soil moisture and temperature readings at 4-in, 12-in, and 22-in depths.

Soil Health Principles

1) Minimize Soil Disturbance
2) Maximize Soil Cover
3) Maximize Plant Diversity
4) Maximize Presence of Living Plants/Roots
5) Integrate Livestock
6) Know your Context

Soil health sampling began September 2024, following harvest, and will occur annually through 2026. Three, 0–6-inch composite samples were collected from three locations within 10-feet from the sensors. Samples were submitted to the University of Missouri for an expanded soil health analysis, which includes:

- Potentially Mineralizable Nitrogen
- Active Carbon
- Total Organic Carbon
- Water Stable Aggregates
- pH (salt and water)
- Effective Cation Exchange Capacity
- Exchangeable Cations
- Plant Available Phosphorus

To prevent damage, most of the sensors are removed each fall and reinstalled in spring following planting. Data collection will continue over two more field seasons, concluding the project in Spring 2027.

By comparing data collected on fields where soil health management principles have been implemented with data from adjacent conventionally managed fields, farmers will have the opportunity to better understand how management can influence water infiltration and holding capacity, leaching potential, aggregate stability, and other soil properties critical to improving climate resiliency and reducing erosion. This project also strives to build collaborative farmer networks to share data and findings, with a goal of improving land stewardship and empowering landowners across Mississippi and Alabama.

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PARTNERS & SPONSORS

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement 02D48223-0 to Sand County Foundation. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Sand County Foundation inspires and empowers a growing number of land owners and managers to ethically care for the land to sustain water resources, build healthy soil, enhance wildlife habitat, and support outdoor recreation.

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